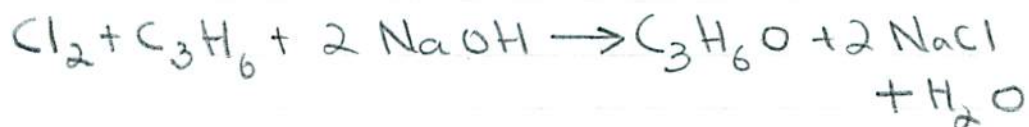


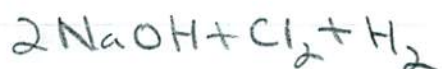
### Problem 1-9



a) Poor example of "green chemistry"

- 7 atoms of by-products / 10 atoms product
- $\text{Cl}_2$  is hazardous
- neither Na nor Cl are in the final product
- $\text{Cl}_2$  manufacture is energy-intensive

b) Might be recycled back to  $\text{Cl}_2$ :



Feasibility depends on:

- extent of organic contamination of NaCl
- proximity of  $\text{C}_3\text{H}_6\text{O}$  plant to  $\text{Cl}_2$  plant
- cost of power at  $\text{C}_3\text{H}_6\text{O}$  plant

NaCl may have to be disposed of as waste.

c) Cl is for control of reaction rate / reaction selectivity